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Can Bond Funds demand explain the surge in Cov-lite Corporate Bonds?

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Abstract

In this paper, I investigate whether the surge in "cov-lite" bonds can be attributed to the increased participation of Bond Funds in the U.S. Corporate Bond Market. Combining data from FISD and Morningstar, I show that bonds issued in periods of low interest rates tend to have fewer covenants. I find no evidence of bonds owned to a greater extent by Bond funds, to have fewer covenants. Nonetheless, I confirm that funds increase their holdings in corporate bonds to bonds with less than mean covenants by 3.45% following a one-unit increase in the *yield slope*. These funds generate higher returns.

Key Words: Bond Covenants; Cov-lite; Credit Quality Deterioration; Corporate Bond Mutual Funds; U.S. Corporate Bond Market.

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1. Introduction

Corporate bonds constitute a very important source of financing for non-financial firms worldwide. As of the end of 2019, the total amount outstanding of corporate debt issued through bonds reached its historical maximum value of USD 13.5 trillion in real terms, as reported by OECD (Çelik, Demirtas and Isaksson 2020). Underpinning this all-time high value is the increasing issuance of corporate bonds after the financial crisis of 2008. In the United States, the annual average issuance of corporate bonds increased by 58.9%, from USD 852.2 during the period between 2000 and 2008, to USD 1 353.9 billion from 2009 onwards (**Figure 1**). The economic cycle precedent to the financial crisis of 2008 is characterized by all-time low interest rates and expansionary monetary policies from major central banks. Firms are then increasingly incentivized to issue new debt to benefit from lower borrowing costs.

A growing concern for regulators is the gradual deterioration in the credit quality of corporate debt. As reported by OECD (Çelik et al. 2020), the share of High Yield (HY) bonds in global bond issuance has been above the 20% for the past 10 years, with exception of 2018. A more in-depth analysis by the authors within the Investment Grade (IG) category exhibited a large rise in the issuance of BBB rated bonds. In 2008, BBB rated bonds accounted for 30% of all IG bond issues. In 2019, BBB rated bonds represented 50.9% of all IG issues. In the U.S. Corporate Bond Market, credit deterioration is likewise significant. The annual average percentage of HY bonds in the total of non-convertible bond issues increased by 61.9%, from 11.4% during the period of 2000 and 2008, to 18.4% in the period after 2009 (**Figure 2**).

Hand in hand with the decline in overall bond quality is the increased risk appetite of institutional investors. When interest rates are low, asset managers take on more risk to

guarantee returns to their clients. This includes foregoing covenant rights. Covenants are legal clauses included in a debt contract to prevent the issuer from undertaking certain actions that may be detrimental to bondholders. Çelik et al. (2020) document a significant shrink in the "covenant protection index"[1] for non-IG bonds issued in the U.S. by non-financial firms. This index decreased from 47%, in 2000, to 38%, in 2019. For IG bonds, covenant protection remains unchanged, despite the rise in the issuance of BBB rated bonds.

Another shared concern among practitioners is the increased holdings of Investment Funds in the Corporate Bond Market. In 2000, U.S. Investment Funds accounted for 10% of total domestic ownership of U.S. corporate bonds. This value peaked to 27.7% in 2018. Data is from OECD (Çelik et al. 2020). Investment Funds have rating-based investment mandates. As such, potential downgrades of in-demand BBB rated bonds, in an economic downturn, may preclude certain investment vehicles from holding bonds that are rated BB+ or below. Consequent sell-offs can threaten financial stability due to the illiquid nature of HY bonds and the open-ended structure of mutual funds.

Motivated by the increased interest and rising concerns for credit quality deterioration in the U.S. Corporate Bond Market, I seek to answer the following questions: What's the impact of interest rates and bond market liquidity on issue-level debt covenants? Does the increased demand of mutual funds for corporate bonds shifted the market towards more issuer friendly terms? Do funds allocate a higher percentage of their holdings to bonds with less covenants in periods of low interest rates and high liquidity? Do funds that allocate a higher percentage of their holdings to bonds with less covenants perform better and attract more inflows?

[1] The *Covenant Protection Index* is a commonly used metric to access covenant protection (See Billet et al. 2007, and Çelik et al. 2020). It is obtained by dividing the number of covenants in a bond by all conceivable covenants. The lower this index, the weaker the covenant protection.

2. Literature Review

Most empirical literature on the determinants of bond covenants is based on the sample of publicly offered U.S. bonds reported by FISD. Smith and Warner (1979) is the classical reference for the construction of covenant variables. Smith and Warner identify four main sources of conflict between bondholders and shareholders: dividend payment, claim dilution, asset substitution, and underinvestment. According to the type of activity restricted, they categorize covenants in four groups: investment covenants, dividend covenants, financing covenants, and bonding covenants. Reisel (2014) follows this covenant construction to show that restrictions on financing and on investment activities reported by FISD lower the cost of debt. This evidence is consonant with the role of debt covenants in preventing managerial opportunism. More recently, Daniel, Miguel, and Beatriz (2018) have identified an increase in the number of independent directors on firms' boards of 24% after a covenant breach. As further documented, these renewed boards are more likely to adopt creditor-friendly policies, including dividend cuts and operational risk reduction. Higher yields thus come at a price!

In spite of the literature results supporting the role of covenants in optimal financial contracting, creditor protection has been deteriorating in the last decade, as extensively documented in my introduction. Credit deterioration is not limited to the Corporate Bond Market. In fact, most published academic papers focus on the Leveraged Loan Market. This gap in the literature may be due to a common belief that bond covenants, due to their wide-dispersed investor base, are nearly irrelevant (Kahan and Tuckman 1993, and Verde 1999).

Credit deterioration in the Leveraged Loan Market constitutes the object of study by Becker and Ivashina (2016). In the 1Q of 2009, "cov-lite" loans were nearly inexistent. In 2015, the

fraction of "cov-lite"[2] loans was sharply above at 70%. The concurrent compression in loan spreads, corroborates, in the authors' view, the theory that this phenomenon has been driven by borrowers. Empirical results from the study, evidence that this development can be highly attributed to changes in the investor base for leveraged loans.

The previous paper flags for the structural changes in the demand for leveraged loans. Çelik et al. (2020) do a similar job for corporate bonds. A deeper look into the holders of U.S. corporate debt is thus required. Specifically, I search for the changing incentives of Bond Funds.

A research paper by Choi and Kronlund (2017) on "reaching for yield" (RFY) across U.S. Bond Funds shows that funds are incentivized to forego control rights in order to boost yields. Coefficients estimates of future fund flows on active shift in "RFY" are positive and statistically significant. The results remain unchanged when the authors control for past performance, evidencing that investors may have a preference for higher yield funds independent of past returns. Time-series regressions of "RFY" indicate that when interest rates are low and market liquidity is high, funds are further incentivized to invest in HY securities. Such results are consonant with fewer investment opportunities available in the market.

As to my knowledge, I add to the existing literature novel findings on the determinants of bond covenants. Most empirical designs on covenants are well summarized by the Poisson model proposed by Brockman et al. (2018), to which I add new fund-level and macroeconomic control variables. I also contribute to the existing literature on fund flows and returns, by running time-series regressions of asset allocation to bonds with less than mean covenants.

[2] "Cov-lite" contracts are defined by Becker and Ivashina (2016) as equivalent to incurrence provisions. "Cov-lite" contracts do not necessarily have fewer covenants according to the authors' definition scope. In my paper, however, "cov-lite" contracts are used interchangeably with bonds having fewer covenant provisions.

3. Hypotheses Formulation

In this section, I define my research hypotheses by specifying the economic relationship I expect to obtain between the explanatory variables and the explained variable. Based on the literature reviewed above, I formulate four main hypotheses, two of which are at the bond-level and the others are at the fund-level. Hypotheses at the bond-level have as a dependent variable the number of covenants in a bond. Hypotheses at the fund-level have as a dependent variable the fund asset allocation to bonds with less than mean covenants, net inflows, or returns.

Hypothesis 1 (Bond-Level): *There is an increase in the issuance of bonds with fewer covenants when interest rates are low and market liquidity is high.*

The construction of the first hypothesis is based on the increased risk-taking by Investors when interest rates are low and market liquidity is high. Choi and Kronlund (2017) show that funds tilt their portfolios towards lower-rated, long maturity. and "HY-lite" bonds during these periods. As such, I expect an increase in the issuance of HY bonds with fewer covenants when interest rates are low and market liquidity is high, *ceteris paribus*.

I test **H1** by regressing the number of covenants on the *yield slope*, *default spread*, *liquidity in the U.S. Corporate Bond Market,* and a set of issue-level and country-level control variables. These regressors are constructed following Choi and Kronlund (2017). I introduce, however, a different measure to account for liquidity. This measure corresponds to the average daily trading volume in the U.S. Corporate Bond Market, downloaded from the Securities Industry and Financial Markets Association. An identical approach is to use the turnover of bonds (Anderson et al. (2017), Dick-Nielsen et al. (2012), and Friewald et al. (2012)).

Hypothesis 2 (Bond-Level): *Increased ownership of Corporate Bonds by Corporate Bond Mutual Funds predicts less covenants in place for a bond.*

The construction of this second hypothesis is based on the increased participation of Bond Funds in the Corporate Bond Market. As documented by Becker and Ivashina (2016), covenant provisions are less attractive in wide-dispersed investor bases. Moreover, Mutual Funds are incentivized to take on excessive risk to improve their relative ranking (Huddart 1999). Feroli et al. (2014) pinpoint that "the more [active investors] try to avoid underperforming, the harder any particular [active investor] must try to avoid the fate of underperforming". I then expect looser covenants for bonds owned to a greater extent by Corporate Bond Mutual Funds.

In testing **H2**, I regress the total number of covenants on the percentage of the bond that is owned by U.S. Corporate Bond Mutual Funds and a set of control variables.

Hypothesis 3 (Fund-Level): *Funds allocate a higher percentage of their holdings to bonds with less than mean covenants when interest rates are low and market liquidity is high.*

In this third hypothesis, I access how much the interest rate environment and market liquidity explain the share of a fund's holdings that is allocated to bonds with less than mean covenants. The motivations are the ones pinpointed for **H1**. I expect funds to hold more bonds with less than mean covenants in periods of low interest rates and high liquidity, *ceteris paribus*.

To test **H3**, I regress the percentage of a fund's holdings that is allocated to bonds with less than mean covenants on the *yield slope*, *default spread*, *liquidity in the U.S. Corporate Bond Market* and a set of fund-level control variables.

Hypothesis 4 (Fund-Level): *Increased asset allocation to bonds with less than mean covenants predicts greater fund returns and more inflows from Investors.*

In my last hypothesis, I investigate whether funds that allocate a higher percentage of their holdings to bonds with less than mean covenants experience greater returns and attract more inflows. Agreeing on looser covenants is a form of risk-taking. As such, I expect funds with a larger asset allocation to bonds with less than mean covenants to have a better performance in the short-term *ceteris paribus*. On a risk-adjusted basis, however, these funds underperform a passive benchmark (Huddart 1999). Likewise, Patel et al. (1993) report a positive relationship between fund inflows and fund past recent performance. Choi and Kronlund (2017) define it as a "return-chasing channel" and distinguish it from a "catering channel", which specifies that investors may have a preference for high yielding funds independent of past returns. My focus is then on investigating the indirect effect of bond covenants, via higher yields, on future flows independent of past returns.

In testing **H4**, I undertake two separate tests. In my first model, I regress monthly fund returns on the *asset allocation to bonds with less than mean covenants,* lagged by one quarter. On my second model, I regress quarterly fund flows on the *asset allocation to bonds with less than mean covenants*, *past flows*, *past returns*, *squared past returns* and a set of fund-level control variables. All regressors of the former are lagged by one quarter.

4. The Data

To study credit quality deterioration in the U.S Corporate Bond Market, I analyze the following databases: (1) the Mergent Fixed Income Securities Database (FISD) for detailed information on publicly offered U.S. bonds, such as the types of covenants in place and the rating history of the bond, (2) Morningstar for holdings data of U.S. Fixed Income funds, (3) the Securities Industry and Financial Markets Association (SIMFA) to collect data on the U.S. Fixed Income Market, namely the average daily trading volume, (4) The Federal Reserve Bank of ST. Louis for data on the term structure of the interest rates, including the *yield level* and the *yield slope,* and for data on the *default spread*, and (5) World Bank to access data on development indicators, such as *GDP Growth* (annual %) and *Inflation* (annual %).

4.1. FISD - U.S. Bonds Data

I have accessed FISD database through Wharton Research Data Services (WRDS). FISD has a comprehensive coverage of publicly offered U.S. bonds. It contains cross-sectional data on the characteristics of over 450,000 U.S. bonds issued between 1950 and 2019. The variables included in the data frame and directly applied in this empirical research are the following:

- **Identification Variables:** Issue ID and Complete CUSIP. These variables are of particular relevance when linking each issue's data among different data frames.
- **Issue Information:** Bond Type, Offering Date, Country Domicile, Industry Group, Offering Amount, Coupon, Maturity, Rating, Security Level.
- **Restrictive Variables:** Restrictive variables represent covenants that restrict borrower's actions and are coded with either *Y*, indicating that the covenant is in place, or *N*, indicating

that the covenant is not in place. In the variable construction section, I describe which FISD variables are considered to represent a certain type of covenant.

To ensure the validity and quality of the data, I have excluded from the original data frame all bonds issued prior to 1989 and for which no offering date, offering amount, maturity date, coupon, or covenant information is provided. The same approach is followed by Miller and Reisel (2012), and Brockman, Ghoul, Guedhami, and Zheng (2018). Finally, I narrow the sample to issues of bond type *CDEB* (US Corporate Debentures), *USBN* (US Corporate Bank Note), *CMTN* (US Corporate MTN), and *CMTZ* (US Corporate MTN Zero). I do so since I am mainly focused on studying credit quality deterioration in corporate bonds with no complex optionalities. Finally, I only consider bonds issued between the period between 2003 and 2019. It is within this range that the holdings data from Morningstar is reported.

The above procedures resulted in a final sample of 17 530 bonds issued over the period between 2003 and 2019. **Table 1** presents descriptive statistics, such as mean, median, and standard deviation for each variable. Consistent with the data reported by Çelik et al. (2020), the annual average of bonds issued in the sample increased by 38% between the period before and after the financial crisis of 2008. This surge was largely driven by the increasing issuance of HY bonds. A more in-depth analysis within the IG category shows that the issuance of AAA rated bonds in the sample decreased massively, contrasting with the significant increase in the issuance of BBB- bonds. Consonant with Billet et al. (2007), and Brockman et al. (2018), the majority of bonds issued in the two sample periods are senior and mature within 5 to 15 years. Finally, bonds in the later sample display higher offering amounts and lower coupon rates.

4.2. Morningstar – Holdings Data of U.S. Fixed Income Funds

The Morningstar database contains panel data on bond holdings of over 1,500 U.S. open-end Fixed Income Funds, covering the period from 2003 to 2019. The data includes both surviving and dead funds, preventing survivorship bias from distorting the results obtained. The variables included in the database and directly applied in this empirical research are the following:

- **Identification Variables**: Fund Id and CUSIP. Fund Id is of particular relevance when linking each fund's data among different data frames from Morningstar.
- **Fund Information**: Inception Date, Expense Ratio, Size, Morningstar Institutional Category, Share Class, Net Flows and Returns.
- **Holdings Information**: Reporting Date, Holding Type ID, Value Weighting and Value Number of Share. *Value Weighting* corresponds to the percentage of the fund portfolio a specific holding represents. *Value Number of Share* equals the amount in dollars of the holding.

To inspect the integrity of the holdings data, I start by summing up all the holdings of a *fund id* for the same reporting date. Invalid descriptive statistics have led me to identify holdings with negative market values being reported as positive weights. As such, I've converted the weights to negative where the market value of the holding was negative, obtaining more accurate results. I have then excluded all the funds whose holdings did not sum up to close 100 on the same date. Consonant with the data cleaning of FISD, I then narrow the original sample to holdings of type *B* (Corporate Bond) and *5* (Bond-Corporate Bond), to work only with plain vanilla corporate bonds. I organize the data by quarter, to ensure the results do not get biased

towards funds that report their holdings with more frequency. Finally, I only consider funds for which there is matching information from FISD.

The above procedures resulted in a final sample of 1 241 funds. **Table 2** present summary statistics of the most important variables employed in the analysis. All fund characteristics reported at the share class level are computed as the size-weighted average of all share classes for the same fund. Based on *Morningstar Institutional Category*[3], I distinguish HY funds from Others. From **Panel A** of **Table 2,** HY funds allocate on average 84.64% of their holdings to corporate bonds, well above the 38.45% invested by Other funds. In reverse, HY funds allocate a smaller fraction of their corporate bond holdings to bonds with less than mean covenants. These results are consonant with HY funds investing primarily in lower-rated bonds, which often have more covenants. An alternative view of the data by sample period, in **Panel B** of **Table 2,** evidences the increasing popularity of Bond Funds. The average size of the sample funds more than doubled in the last decade. Finally, the sample funds have performed worse in the last decade, as has the Barclays U.S. Aggregate Corporate Bond Index.

5. Dependent Variable Construction – Bond Covenants

The main dependent variable of this study is the total number of covenants in place for a bond. FISD reports over 50 variables on bond covenants. bondholder protective, issuer and subsidiary restrictive covenants (Qi et al. 2011). The last two are identified in WRDS query form as "Additional Issuer Information". In this section, I describe the methodology used to classify bond covenants reported by FISD.

[3] Morningstar segments Taxable Bond Funds in 22 categories based on the duration and credit quality of the funds' portfolio. Funds classified as *High Yield Bond* invest primarily in low quality bonds, namely unrated securities.

In my literature review, I have cited Smith and Warner (1979) for their pioneer work on covenants. I have named the four sources of bondholder-shareholder conflict, which constitute the basis for the categorization of debt covenants. I now describe each one in more detail.

- **Dividend Payment**: The firm finances the increase in dividend payments by reducing investment (aka, "Milking the Firm"). In the limit scenario, the firm is liquidated to pay dividends, and bondholders are left with worthless claims (Smith and Warner 1979).
- **Claim Dilution**: The firm issues additional debt of equal or higher priority. Hence, the firm's probability of default increases, and the total assets available to unsecured creditors in bankruptcy decreases (Nash et al. 2003, and Brockman et al. 2018).
- **Asset Substitution**: Management substitutes safer with riskier projects (Nash et al. 2003). Debtholders are due to receive a regular fixed schedule of payments into the future, and so do not benefit from an increasing variance in the firm's value.
- **Underinvestment**: Equity holders reject positive NPV projects because debtholders capture most of the gains from the investment.

The above agency problems are intensified when the firm is near financial distress, i.e., when the firm's operating cash flows are known to be insufficient to meet its upcoming obligations (Nash et al. 2003). Bondholders are then more likely to demand restrictive covenants the closer the firm is to financial distress.

As to the methodology, I follow the 22 covenant dummies construction proposed by Qi, Roth, and Wald (2011). According to the type of activity restricted, and respective conflict of interests mitigated, I group covenants reported by FISD in eight major categories, as follows:

Payment Restrictions: Prevent managers from value transfer to equity holders in the form of dividends, by restricting payouts. FISD Variables: (1) dividends_related_payments_is; (2) dividends_related_payments_sub; and (3) restricted_payments.

Borrowing Restrictions: Protect bondholders from having their claims on the assets of the firm diluted. It does so by limiting the firm's ability to issue additional debt of equal or higher priority. Borrowing Restrictions include: (1) Liens Restrictions; (2) Issuer Indebtedness Restrictions; and (3) Subsidiary Indebtedness Restrictions. FISD Variables: (1.1) liens_is; (1.2) liens_sub; (1.3) negative_pledge_covenant; (2.1) subordinated_debt_issuance; (2.2) senior_debt_issuance; (2.3) indebtedness_is; (2.4) funded_debt_is; (2.5) sales_leasback_is; (2.6) leverage_test_is; (3.1) indebtedness_sub; (3.2) leverage_test_sub; (3.3) funded_debt_sub; (3.4) sales_leaseback_sub; and (3.5) subsidiary_guarantee.

Asset and Investment Restrictions: Protect bondholders from risk-shifting expropriation, by limiting managers freedom to take on risky investments. Like Qi et. al (2011), I further segment this category into: (1) Asset Sales; (2) Capital Expenditures; (3) Affiliate Transactions. FISD Variables: (1.1) asset_sale_clause; (1.2) sale_assets; (1.3) sale_xfer_asset_unrestricted; (2.1) investments; and (2.2) investments_unrestricted_subs; (3.1) transaction_affiliates.

Stock Issuance Restrictions: Prevents the firm from issuing additional common stock, preferred stock, or other stock transfers. FISD Variables: (1) stock_issuance; (2) stock_issuance_issuer; (3) preferred_stock_issuance; (4) stock_transfer_sale_disp.

Default-Related Covenants: Allow bondholders to trigger default and to accelerate their debt, if an event of default occurs under any other debt of the company. FISD Variables: (1) cross_default; and (2) cross_acceleration.

Anti-Takeover-Related Restrictions: Protects bondholders from an unwanted takeover, by conceding to them the right of selling the issue back to the issuer upon a change of control in the firm. FISD Variables: (1.1) consolidation_merger; (1.2) change_control_put_provisions.

Profit Maintenance Covenants: Requires the firm to keep sound financial ratios. In case of non-compliance with these financial metrics, the issuer is either prevented from undertaking a certain action ("Incurrence Covenants"), such as issuing new debt, or the lender is given the right to trigger certain bond provisions ("Maintenance Covenants"). FISD Variables: (1.1) maintenance_net_worth; (1.2) declining_net_worth; (1.3) net_earnings_test_issuance; (1.4) fixed_charge_coverage_is; and (1.5) fixed_charge_coverage_sub.

Rating Trigger Covenants: Protects bondholders from credit rating declines by triggering a bondholder put provision. FISD Variables: (1.1) rating_decline_trigger_put.

All in all, I consider 37 FISD variables in my covenant analysis. I start by creating a covenant frequency variable to count the total number of restrictive covenants in a bond. From there, I construct the "covenant protection index". I also design a covenant dummy variable taking the value of 1 in case the bond has more than mean covenants, and 0 otherwise. This dummy is of particular relevance for the logistic regressions on bond covenants and for the fund-level regressions. In the following section, I describe the characteristics of the outlined covenant variables.

5.1. Descriptive Statistics

Table 3 reports the incidence of covenants by category for the full sample. 99.3% of the bonds have at least one covenant. The average number of covenants is 6.75, with a maximum value of 22 covenants reported. The most frequently used categories of covenants are, by descending order, anti-takeover restrictions (91%), asset sales restrictions (77.9%), default-related covenants (75.1%), and borrowing restrictions (73%). On the opposite end, rating trigger covenants (0.9%), and investment restrictions (1.7%) are rarely used. The incidence of covenants in the sample is higher than documented by Billet et al. (2007), and Qi et al. (2011).

For time-series analysis, I report the average number of covenants and their incidence by category in different years. **Figure 3** shows that the average number of covenants across years for the full sample is quite volatile and lacks any insightful pattern. As such, I break down the data into IG and HY bonds. The latter do exhibit a diminishing trend of average covenants. Furthermore, HY bonds present higher average covenants than IG bonds. As documented by the SEC's Office of Investor Education and Advocacy (2013), HY bonds often have more covenants than IG bonds, as they generally present a higher risk of default. However, as documented by the same source, when the demand for HY bonds is high, bond issuers gain a stronger footing when issuing debt, and may include fewer covenant protections. **Figures 4** & **5** display the declining frequency of the various types of covenants.

A more robust metric to access credit quality deterioration is the "covenant protection index". **Figure 6** shows that the level of protection granted to HY bondholders has deteriorated sharply. Concomitant with expectations of increased short-term interest rates in the future, the covenant protection index temporarily re-surged between 2009 and 2014.

6. Independent Variables Construction

The main variables of interest in this study are the Interest Rate Environment, Market Liquidity, and Funds participation in the U.S. Bond Market. In this section, I first detail the procedures followed to construct these variables' proxies and then conduct a univariate analysis to gauge the expected effect the variables have on the dependent variable.

6.1. Yield Curve and Market Liquidity

In studying the Interest Rate Environment, I examine the *yield slope* and *default spread*. Data on yield curve rates is disclosed on a daily basis by the Federal Reserve Bank of St. Louis. As such, I link interest rates to bond covenants in FISD based on the offering date of the issue. A bond issued in November of 2003 is attributed the *yield slope*[4] and *default spread*[5] prevalent in that date. I apply the same methodology for market liquidity. Historical data on the average daily trading volume in the U.S. Corporate Bond market, which I use to proxy market liquidity, is reported annually by SIMFA. Hence, I merge the data based on the offering year of the issue.

Plotting together the *yield slope* and *default spread* with the annual average of bond covenants (**Figure 7**) suggests that there might be a positive relationship between the variables. The opposite is found for *trading volume* (**Figure 8**). A more granular analysis of the data using *Kernel Density Estimates* exhibits a significant, but very weak, linear relationship between the *yield slope, default spread* and *trading volume,* and the number of covenants in place for a bond. The estimates obtained are all significant and of, respectively, 0.01, -0.03, and -0.11.

[4] The *yield slope* is computed as the difference between the *30-year Treasury Rate* and *1-year Treasury Rate*.
[5] The *default spread* equals the difference between the effective yield of the BBB Corporate Index and AAA Corporate Index.

6.2. Funds Participation in the U.S Corporate Bond Market

To analyze funds participation in the U.S. Corporate Bond Market, I add a new variable to the data frame called *fund weight in bond*. This variable captures the percentage of a bond held by each sample fund. It is obtained by dividing the quantity of the holding in 1 000$ by the bond outstanding amount at a certain date. Two issues arise from the data. First, FISD reports the bond outstanding amount for an effective date, i.e., no historical data is recorded. As such, I proxy the prevalent outstanding amount, which rarely changes for a bond, by the *offering amount*. Second, the amount in dollars of a bond held by a fund might change over time. This occurrence can be easily observed in the data. Hence, I query the holdings data for each fund and do the arithmetic average of the time-series data on the respective holdings by *cusip*. At last, I sum all the *fund weight in bond* for each bond and obtain the share of the bond that is held by Bond Funds from Morningstar.

Contrary to what was initially expected in **H2**, *fund weight in bond* appears to be positively correlated with the number of covenants in a bond (**Figure 9**). A valid explanation can be the increasing custody of HY bonds by the sample funds. Nonetheless, when segmenting the sample to HY bonds only, the Kernel Density Estimate remains positive (0.31) and significant.

6.3. Asset Allocation to Bonds with Less than mean covenants

Allocation to bonds with less than mean covenants is used both as a dependent and independent variable in the fund-level regressions. In constructing this variable, I start by creating two separate, albeit identical, data frames. The first presents quarterly data on the percentage of

each fund's holdings that are allocated to corporate bonds with more than mean covenants. It is obtained by first querying the original holdings database to corporate bonds with at least 7 covenants, and then grouping the data by *fund Id* and *reporting date*. The same procedures are used to create the second data frame, which contains quarterly data on the percentage of each fund's holdings that are allocated to bonds with less than mean covenants. I then merge back the two individual data frames. Finally, I re-scale the weights to capture the share of corporate bond holdings, instead of overall holdings, with less than mean covenants.

Figure 10 exhibits quarterly data on the *asset allocation to bonds with less than mean covenants*. On average, funds have been allocating a smaller fraction of their holdings to bonds with less than mean covenants. Such tendency seems to contradict **H3** that funds are neglecting covenants in their debt contracts. It is premature to conclude that. These results might be biased towards the increasing ownership of HY bonds by the sample funds. Thus the importance of conducting a multivariate analysis, where all control variables are added.

7. Empirical Design

I now describe the econometric methods used to test the hypotheses stated in the Hypotheses Formulation. I further specify the sort of equations I estimate.

7.1. Poisson Regression (Bond-Level)

To test the two initial hypotheses at the bond-level, I use a Poisson Regression. Poisson regression is the most commonly used econometric method in empirical studies on bond covenants (Billet et al. 2007, and Brockman et al. 2018). As argued by Jeffrey Wooldridge

(2012), the normality distribution assumption does not hold for count variables and, as such, a Poisson regression should be used instead of a linear regression model.

The Poisson Regression I construct to relate the number of covenants in place for a bond with the Interest Rate Environment, Corporate Bond Market Liquidity, and Funds Participation in the U.S. Corporate Bond Market, looks as follows:

$$Covenants = \alpha_0 + \alpha_1 YieldSlope + \alpha_2 DefaultSpread + \alpha_3 Liquidity + \alpha_4 Fund\_Weight\_in\_Bond + \alpha_5 ILV + \alpha_6 CLV + \mathcal{E} \quad (1)$$

The dependent variable, *Covenants*, is a count variable indicating the total number of covenants in a bond. The independent variables of interest are the *yield slope*, *default spread*, *trading volume*, and *fund weight in bond.* Following Brockman et al. (2018), I add to the equation issue-level controls (*Offering Amount, Maturity, Coupon*, and *Rating)* and country-level controls (*GDP Growth* and *Inflation*). **Table 4** describes each variable units of measurement.

7.2. OLS Regressions (Fund-Level)

In testing the last two hypotheses at the fund-level, I use Ordinary Least Squares (OLS). In all model specifications, the dependent variable is of continuous nature. I then formulate the following estimated multiple regression equations:

$$Allocation\ to\ Bonds\ with\ Less\ Than\ Mean\ Covenants = \alpha_1 YieldSlope + \alpha_2 DefaultSpread + \alpha_3 Liquidity + \alpha_4 HYFundDummy + \alpha_5 FLV + \mathcal{E} \quad (2)$$

$$Fund\ Returns =$$

$$\alpha_1 Allocation\ to\ Bonds\ with\ Less\ Than\ Mean\ Covenants_{Prev.Quarter} + \alpha_2 FLV + \mathcal{E} \quad (3)$$

$$Fund\ Flows = \alpha_1 Allocation\ to\ Bonds\ with\ Less\ Than\ Mean\ Covenants_{Prev.Quarter} + \alpha_2 Flows_{PastYearAvg} + \alpha_3 Returns_{Prev.Quarter} + \alpha_4 (Returns_{Prev.Quarter})^2 + \alpha_5 FLV + \mathcal{E} \quad (4)$$

The above regressions have as main variable of interest *allocation to bonds with less than mean covenants*. In equation 2, the former is used as a dependent variable, to study how it changes with the Interest Rate Environment, Corporate Bond Market Liquidity, and Morningstar Rating Category "High Yield Bond". Additional fund-level control variables include *Size*, *Expense Ratio*, and *Net Flows.* In equations 3 and 4, *allocation to bonds with less than mean covenants* is used, instead, as an independent variable. All variables of the former two regressions are lagged by one quarter. In lagging the variables, I have carefully sorted and queried the data by *date* and *fundid* before applying *pandas.shift()* or *pandas.rolling()* functions. **Table 5** describes each variable units of measurement.

7.3. Checking for Multicollinearity

The low Pearson correlation values among the key regression variables, all below the absolute value of 0.5, indicate that the OLS estimates are unbiased towards multicollinearity. A complementary diagnostic tool of multicollinearity includes the variance inflation factor (VIF). Midi and Bagheri (2010) specify that a VIF between 5 and 10 indicates moderate collinearity. All the VIF values obtained, in each model specification, are well below this range, further evidencing that neither regressors suffer from multicollinearity.

8. Empirical Results

H1: Does the number of covenants increases with interest rates and market liquidity?

Table 6 reports the coefficients from the Poisson regression, where the dependent variable is the total number of covenants, and the independent variables of concern are the *yield slope*, *default spread*, *trading volume*, and *fund weight in bond.* The Likelihood Ratio test indicates that the regressors are jointly statistically significant across all model specifications. Standard errors are clustered at the firm-level to ensure the observations are independent and identically distributed (IID).

Regression (1) of **Table 6**, which does not include control variables, shows coefficients for the *yield slope* and *trading volume* of, respectively, 0.05 and -0.29. These Poisson estimates are interpreted as the difference between the log of expected counts for a one-unit change in the regressor, i.e., $\beta_i = \log\,(u_{x+1}) - \log\,(u_x)$. To improve the readability of the results, I exponentiate the coefficients to obtain the incidence rate ratio (IRR). The IRR of the *Yield Slope* is 1.05, which means that a 1% decrease in the *yield slope* reduces the number of covenants by 5%. **Regressions (2)** and **(3)** add to the model, respectively, issue-level and country-level variables, as well as control for industry-effects. The results obtained remain unchanged in magnitude and significance across all variables, with exception of the *trading volume*. The signs of the controls are as expected. The higher the rating number assigned to the bond, i.e., the worse the bond rating, the larger the expected number of covenants. Moreover, reported estimates of *GDP Growth* are often positive (Brockman et al. 2018). Increased growth opportunities have been shown to rise covenant protection (Billet et al. 2007).

In **Regressions (4)** and **(5)**, I re-do the Poisson regression for HY and IG bonds. The p-values obtained for the *yield slope* and *default spread* are below 1% and, as such, the null hypothesis is rejected. The coefficient of *log trading volume* for HY bonds is negative but statistically insignificant. On the other hand, the coefficient of *log trading volume* for IG bonds is positive and significant. The latter results suggest that the negative relationship between *trading volume* and *number of covenants* is better captured when filtering the sample to HY bonds only.

Contrary to what was initially expected, the *default spread* estimates are negative and significant in all model specifications of **Table 6**, with exception of IG bonds. Such results may be due to the evidenced positive relation between "cov-lite" bonds and credit premiums (Wei 2005, and Reisel 2014). When creditor protection is higher, bondholders demand lower yields. As such, the hypothesized effect of *default spread* on bond covenants might get offset by the former relationship.

H2: Does increased ownership of corporate bonds by Corporate Bond Mutual Funds predicts fewer covenants in place for a bond?

In all model specifications, the coefficient estimates of *fund weight in bond* are positive and statistically significant at the 1% level. From **Table 6**, the IRR is 1.004, which means that a 10% increase in the ownership of corporate bonds by Bond Funds, increases the expected number of covenants by 4%. These findings reject the belief that current diminishing covenants have been directly induced by Bond Funds demand. As documented by Kahan and Tuckman (1993), the terms of public bonds are defined between the issuer and its investment bank. Public investors have no direct influence on the negotiation of debt covenants, as do private lenders. This sheds some light on the low correlation evidenced between the former variables.

H3: Do Bond Funds allocate a higher percentage of their holdings to bonds with less than mean covenants when interest rates are low and market liquidity high?

Table 7 reports estimates from the OLS regression, where the dependent variable is *allocation to bonds with less than mean covenants*, and the independent variables of interest are the *yield slope*, *default spread*, and *trading volume*. The F-test confirms that the variables are jointly statistically significant. Standard errors are clustered at the fund-level.

All the coefficients are statistically significant at the 1% level. Supporting **H3**, the coefficients for the *yield slope* and *log trading volume* are, respectively, -3.45 and 4.21. As such, for each one-unit increase in the *yield slope,* funds allocate, on average, less 3.45% of their holdings in corporate bonds to bonds with less than mean covenants. As in the bond-level regressions, lower *default spread* is associated with fund's bond holdings having more than mean covenants. Consonant with the differing investment strategies, High Yield funds allocate, on average, less 34.95% of their holdings to bonds with less than mean covenants. In fact, HY funds invest primarily in lower rated bonds, which often have more covenants attached.

H4: Do Funds that allocate a higher percentage of their holdings to bonds with less than mean covenants have greater returns and attract more flows from investors?

Table 8 shows that funds that allocate a higher percentage of their holdings in corporate bonds to bonds with less than mean covenants yield greater returns. The coefficient is positive and statistically significant at the 1% level. A 1% change of the former, increases returns by 0.002%, on average. This is a very significant magnitude when evaluated together with the

average returns of 0.29% earned by the sample funds. Additionally, **Table 8** indicates that HY funds yield 0.22% greater average returns than the distinct funds. The results obtained are consistent with "cov-lite" contracts increased risks, compensated by higher beta returns, and HY funds allocating more of their assets to lower-rated bonds.

On the other hand, **Table 8** reports a positive, but insignificant, estimate for the effect of *allocation to bonds with less than mean covenants* on fund flows. It might be the case that the historically low yield levels have reduced the documented impact of covenants on the cost of debt (Reisel 2014). As such, the indirect effect of bond covenants on future flows independent of past returns, via higher yields, might get offset. Regarding the control variables, positive past year average net flows predict greater future inflows. The same tendency is found for increased past performance. The positive and significant estimate for past squared returns evidences the non-linearity relationship between returns and flows reported by Chevalier and Ellison (1997).

9. Alternative Estimation Methods

Table 9 reports estimates from the Logistic regression, where the dependent variable is a covenant dummy, which equals 1 in case the number of covenants in place for a bond is above the mean. The independent variables are kept the same. The coefficients of interest are in the majority statistically significant. The sign of the estimates remains unchanged, providing further evidence on the robustness of the results. **Regression (1)** of **Table 9** refutes, however, that higher *trading volume* increases the likelihood of bonds in the full sample having less than mean covenants. **H2** is once again rejected across all model specifications. As guidance, the exponentiated logistic coefficients are interpreted as the expected change in the odds ratio[6]. As such, for each 1% increase in the *yield slope*, the odds of a bond having more than mean covenants increases by 23.4% (= exp (0.21)).

Following Bazzana, Zadorozhnaya and Gabriele (2018), I further cross-check the Poisson and Logistic results with the OLS estimates calculated by regressing the same predictors over the "covenant protection index" in **Table 10**. The F-test confirms that the independent variables are jointly statistically significant at the 1% level. The sign and significance of all regressors, including the controls, are the same as the ones reported by Poisson. In particular, **Regression (2)** documents a negative and significant estimate for the *log trading volume*. This estimate was negative but insignificant in the Poisson and Logistic regressions for HY bonds. Specifically, for a 10% increase in the *trading volume*, the "covenant protection index" for HY bonds is expected to decrease by -0.46% (= -4.78*ln (1.1)). All in all, the OLS results corroborate **H1**, particularly for HY bonds, and reject **H2**.

[6] $Odds = \frac{p}{1-p}$, where p is the probability of an event occurring; $Odds\ Ratio = \frac{Odds_1}{Odds_0}$, where $Odds_1$ adds to the predictor variable one-unit.

10. Research Limitations

The first limitation of this empirical study is attributing equal importance to the different bond covenants. As noted by Brockman et al. (2018), certain firm activities are subject to a higher number of restrictions. As such, regression analyses based solely on the total number of covenants, overlook the fact that most of these restrictions mitigate the same agency problem. To overcome this concern, a few papers report together with the total number of covenants, a *covenant intensity* regressand. The former identifies whether the bond places restrictions on any of the three following main categories: restrictions on financing, investment, and payouts.

The second, and most impactful, limitation of this research is the non-inclusion of firm-level controls in the regressions at the bond-level. As previously documented, bondholders demand more covenants the near the firm is to financial distress. Frequently used metrics of financial distress include *leverage, interest coverage*, and *profitability* (Miller and Reisel 2012). These variables are available at Compustat. Though, merging them with FISD based on the *cusip* yields no matching results. This is because the *cusip* does not consider mergers and acquisitions, requiring a very demanding manual match of the data by company name.

At last, I consider *trading volume* when proxying liquidity in the U.S. Corporate Bond Market. *Trading activity* variables are commonly used in the literature. However, more robust and complex liquidity measures, such as the *Amihud* and *Roll* measures, have been shown to better capture liquidity effects (Friewald et al. 2012). Choi and Kronlund (2017), for instance, use the *Amihud* measure on their time-series analysis of the impact of market liquidity in "RFY".

11. Conclusion

In this research, I have analyzed in-depth the effect of Bond Funds' demand in the surge of "cov-lite" contracts. I show that bonds issued in periods of low interest rates tend to have fewer covenants. I find, however, no evidence of bonds owned to a greater extent by Bond Funds, to have fewer covenants. As such, no direct link can be established between funds "RFY" when interest rates are low, and the increasing issuance of bonds with fewer covenants. Nonetheless, I confirm that funds tilt their portfolios towards corporate bonds with less than mean covenants when interest rates are low and market liquidity is high. In line with the increased risk-taking, funds generate significantly higher returns from this strategy. Across Bond Funds, High Yield funds allocate, on average, relatively less of their holdings in corporate bonds to bonds with less than mean covenants and have better monthly performance. Such results are consistent with High Yield funds investing primarily in lower-rated bonds, which often have more covenants attached and offer higher yields.

Future research on the same topic can benefit from addressing this study's limitations. This includes adding to the analysis: 1) *Covenant Intensity Indicator*; 2) Firm-Level Control Variables; 3) Improved Liquidity Proxy. Furthermore, Credit Quality Deterioration in the U.S. Corporate Bond Market is not limited to the surge in "cov-lite" contracts. The default risk premium has been at historically low levels. It is thus of great relevance to investigate whether this phenomenon can be attributed to the increasing participation of Bond Funds in the U.S. Corporate Bond Market. Also important, is to analyze how the evidenced negative relationship between bond covenants and yields has changed since the 2006 version of FISD reported by Reisel (2014). One and the other directions for future research will enhance academic's understanding of the recent market shift towards more issuer friendly terms.

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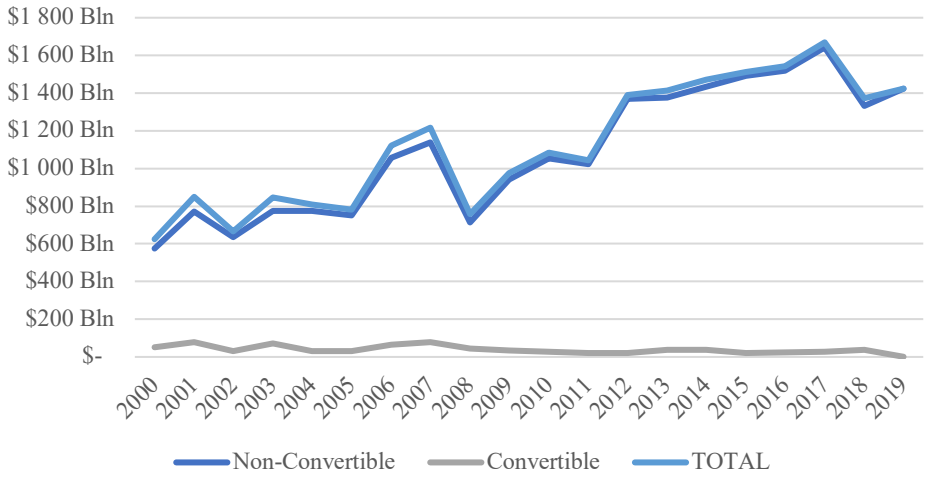
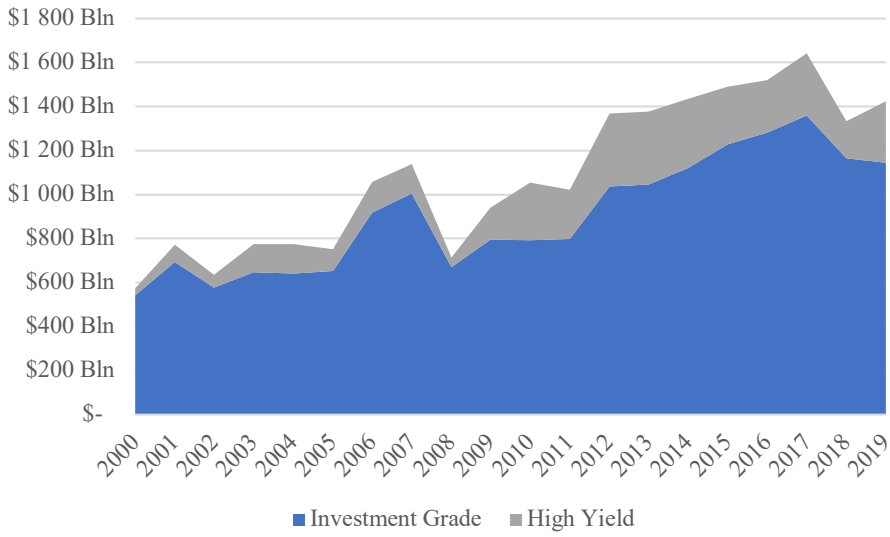
Appendix

Figure 1: U.S. Corporate Bond Issuance (Non-Convertible & Convertible) in USD Billions.



Source: Securities Industry and Financial Markets Association (SIMFA).

Figure 2: U.S. Non-Convertible Corporate Bond Issuance (Investment-Grade & High Yield) in USD Billions.



Source: Securities Industry and Financial Markets Association (SIMFA).

Table 1: Descriptive Statistics for Bond Issues Data.

This table reports descriptive statistics for the sample bonds from FISD. The paper sample is composed of 17 530 bond issues, segmented between the period before and after the financial crisis of 2008. It excludes all bonds issued before 2003 and for which no offering date, offering amount, maturity date, coupon, or covenant information is provided. Also, it only considers issues of bond type *CDEB* (US Corporate Debentures), *USBN* (US Corporate Note), *CMTN* (US Corporate MTN), and *CMTZ* (US Corporate MTN Zero).

	Full Sample (N = 17 530)		Sub-Sample (2003-2009) (N = 11 649)			Sub-Sample (2010-2019) (N = 5 881)		
	Nº of Issues	% of Total	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Full Sample	17 530	100%	828	855	102.8	1 142	1 185	183.1
Investment Grade	8 733	49.8%	429	418	49.4	560	582	102.7
- AAA	132	0.8%	13	11	6.7	5	3	5
- BBB-	1 480	8.4%	54	56	11.2	105	107	30.1
High Yield	8 797	50.2%	399	427	94.5	582	604	100
Senior Debt	17 216	98.2%	808	835	99.2	1 125	1 159	178.7
Junior Debt	309	1.8%	20	17	9.5	17	17	11.2
Low Maturity (< 5 Years)	2 184	12.5%	2.83	3	0.9	3	3	0.8
Mid Maturity ([5.15])	12 912	73.7%	8.3	9	2.2	8	8	2.1
High Maturity (> 15 Years)	2 434	13.9%	31	30	8.1	30	30	6.6
Offering Amount (in thousands)	-	-	514 582	350 000	531 692	716 776	500 000	656 877
Coupon (%)	-	-	6.6%	6.3%	2.5%	4.8%	4.4%	2.3%
U.S.	15 094	86.1%	-	-	-	-	-	-
Canada	433	2.5%	-	-	-	-	-	-
Others	2 003	11.4%	-	-	-	-	-	-
Industrial	11 147	63.6%	-	-	-	-	-	-
Finance	3 922	22.4%	-	-	-	-	-	-
Utility	2 091	11.9%	-	-	-	-	-	-
Government	56	0.3%	-	-	-	-	-	-
Miscellaneous	312	1.8%	-	-	-	-	-	-

Table 2: Descriptive Statistics for Bond Funds Data.

The following tables report descriptive statistics for the sample Bond Funds from Morningstar. The sample consists of 33 540 observations from 1 241 unique funds. It excludes all funds whose holdings did not sum up to close 100 on the same date. All holdings data reported outer of a quarter-end month are removed. Finally, only holdings of type *B* (Corporate Bond) and *5* (Bond-Corporate Bond) are preserved.

Panel A: Portfolio Holdings – High Yield Funds and Others.

	Full Sample (N = 33 540)			High Yield Funds (N = 7 865)			Others (N = 25 675)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Weight in Corporate Bonds	49.28	46.87	34.66	84.64	88.3	63.99	38.45	34.18	25.68
Allocation to Bonds with Less Than Mean Covenants	54.60	56.55	34.54	26.78	23.15	24.59	63.12	68.55	32.61
Return (% Monthly)	0.29	0.24	1.39	0.43	0.54	1.97	0.25	0.19	1.16
Total Net Assets ($M)	2 484.67	438.14	10 589.46	1 269.95	359.44	2 668.6	2 856.77	466.82	11 988.2
Flows ($M Monthly)	11.59	0.12	253	-2.68	-0.1	80.74	15.96	0.26	285
Expense Ratio (% Monthly)	0.4	0.37	4.17	0.51	0.71	1.86	0.36	0.3	4.66

Panel B: Portfolio Holdings – 2000's and 2010's.

	Sub-Sample (2003-2009) (N = 11 062)			Sub-Sample (2010-2019) (N = 22 478)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Weight in Corporate Bonds	45.82	38.45	29.43	47.95	42.93	37.85
Allocation to Bonds with Less Than Mean Covenants	63.53	76.31	36.66	50.21	50.21	32.55
Return (% Monthly)	0.45	0.45	1.78	0.21	0.17	1..15
Total Net Assets ($M)	1401.24	309.26	6306.18	3 017.85	550.188	12 119.93
Flows ($M Monthly)	11.29	0.5	143.06	11.73	1.64	291.70
Expense Ratio (% Monthly)	0.58	0.58	7.07	0.31	0.29	1.17

Table 3: Descriptive Statistics for the 8 Major Covenant Categories.

The following table provides descriptive statistics for the 8 major covenant categories. The sample is composed of the 17 530 bond issues from FISD. Relative frequencies are computed using a dummy variable which equals 1 in case the bond has any covenant of that type.

Types of Covenants	Mean	Median	Std. Dev.	Min	Max	FISD Variables
All Restrictive Covenants						
Nº of Covenants	6.75	6	4.59	0	22	37
Relative Frequency	99.3%	1	0.08	0	1	
Borrowing Restrictions						
Nº of Covenants	2.17	2	1.8	0	9	14
Relative Frequency	72.95%	1	0.44	0	1	
- *Restrictions on Liens*						
Nº of Covenants	0.74	1	0.62	0	3	3
Relative Frequency	65.13%	1	0.48	0	1	
- *Restrictions on Indebtedness Issuer*						
Nº of Covenants	0.65	1	0.65	0	3	6
Relative Frequency	55.1%	1	0.5	0	1	
- *Restrictions on Indebtedness Subsidiary*						
Nº of Covenants	0.78	1	0.83	0	3	5
Relative Frequency	55.6%	1	0.5	0	1	
Asset &Inv. Restrictions						
Nº of Covenants	1.19	1	1	0	6	6
Relative Frequency	78%	1	0.41	0	1	
- *Restrictions on Asset Sales*						
Nº of Covenants	0.95	1	0.62	0	3	3
Relative Frequency	77.86%	1	0.42	0	1	
- *Restrictions on CAPEX*						
Nº of Covenants	0.02	0	0.19	0	2	2
Relative Frequency	1.7%	0	0.13	0	1	
- *Restrictions on Affiliate Transactions*						
Nº of Covenants	0.21	0	0.41	0	1	1
Relative Frequency	20.71%	0	0.41	0	1	
Restrictions on Payments						
Nº of Covenants	0.52	0	1.04	0	3	3
Relative Frequency	22.36%	0	0.42	0	1	
Restrictions on Stock Issuance						
Nº of Covenants	0.21	0	0.54	0	3	4
Relative Frequency	15.23%	0	0.36	0	1	
Restrictions on Anti-Takeover						
Nº of Covenants	1.32	1	0.63	0	2	2
Relative Frequency	90.98%	1	0.29	0	1	
Restrictions on Default						
Nº of Covenants	0.88	1	0.6	0	2	2
Relative Frequency	75.1%	1	0.43	0	1	
Restrictions on Profit/Net Worth						
Nº of Covenants	0.46	0	0.86	0	3	5
Relative Frequency	23.1%	0	0.42	0	1	
Restrictions on Rating						
Nº of Covenants	0.01	0	0.09	0	1	1
Relative Frequency	0.9%	0	0.09	0	1	

Figure 3: Average Number of Covenants in Sample (High Yield and Investment-Grade).

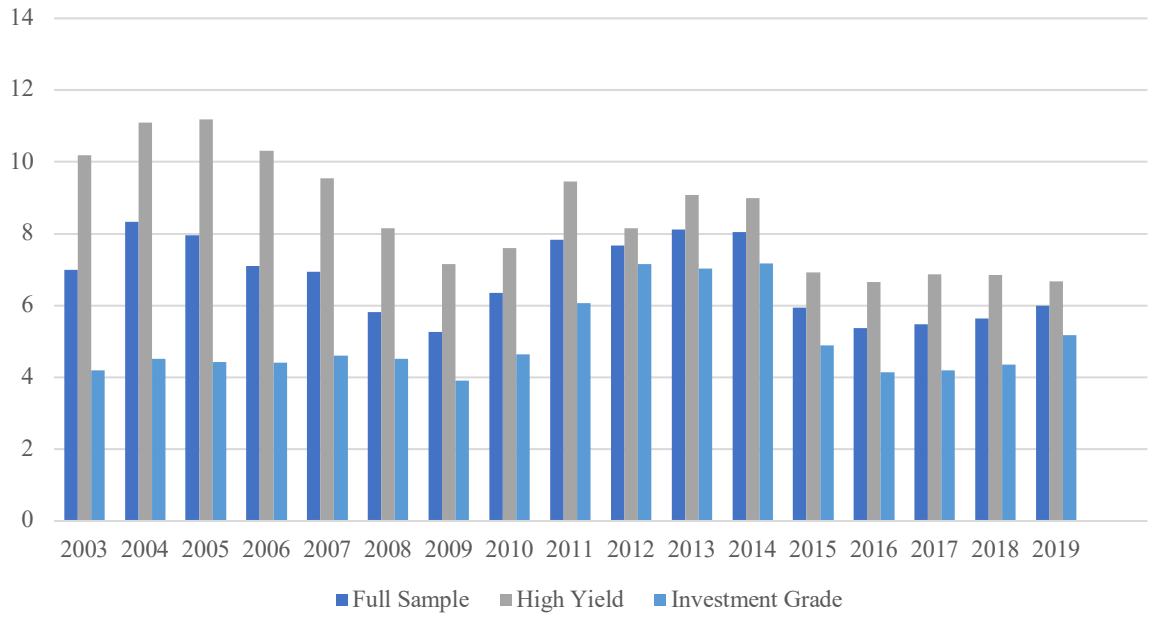


Figure 4: Relative Frequency of the 8 Major Covenant Categories in Sample.

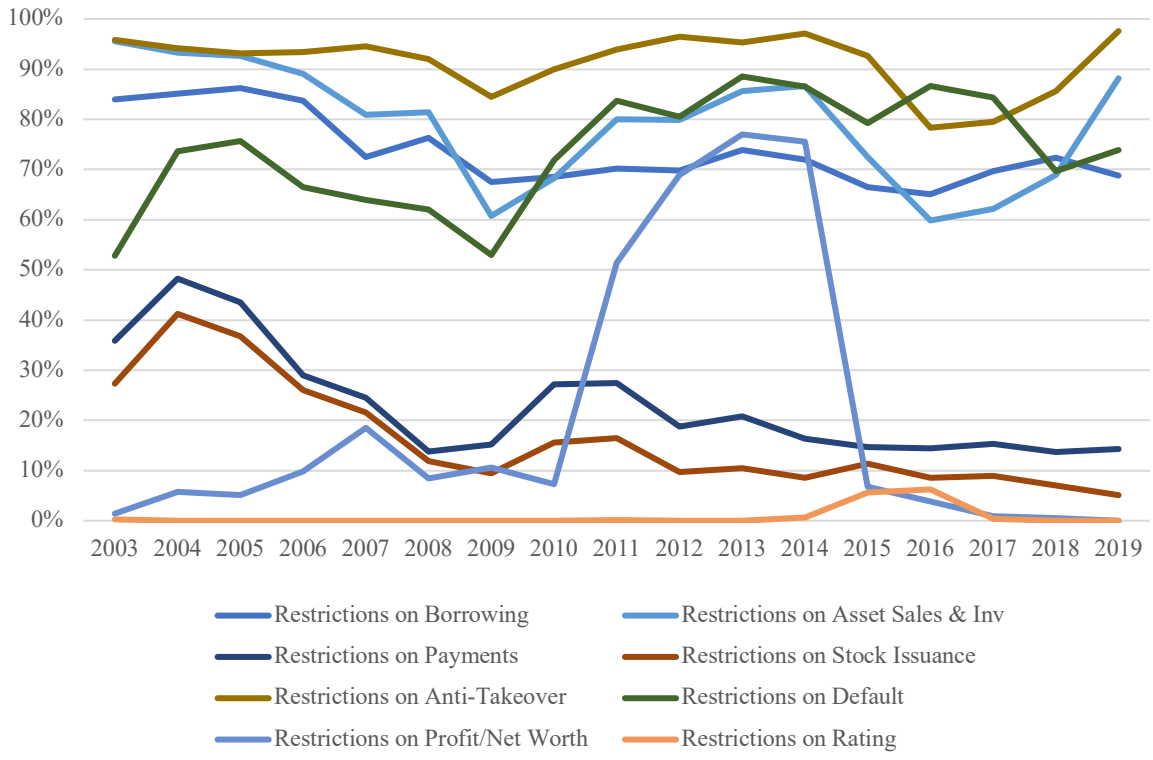


Figure 5: Relative Frequency of Borrowing Restrictions and Restrictions on Asset Sales & Investment by sub-categories.

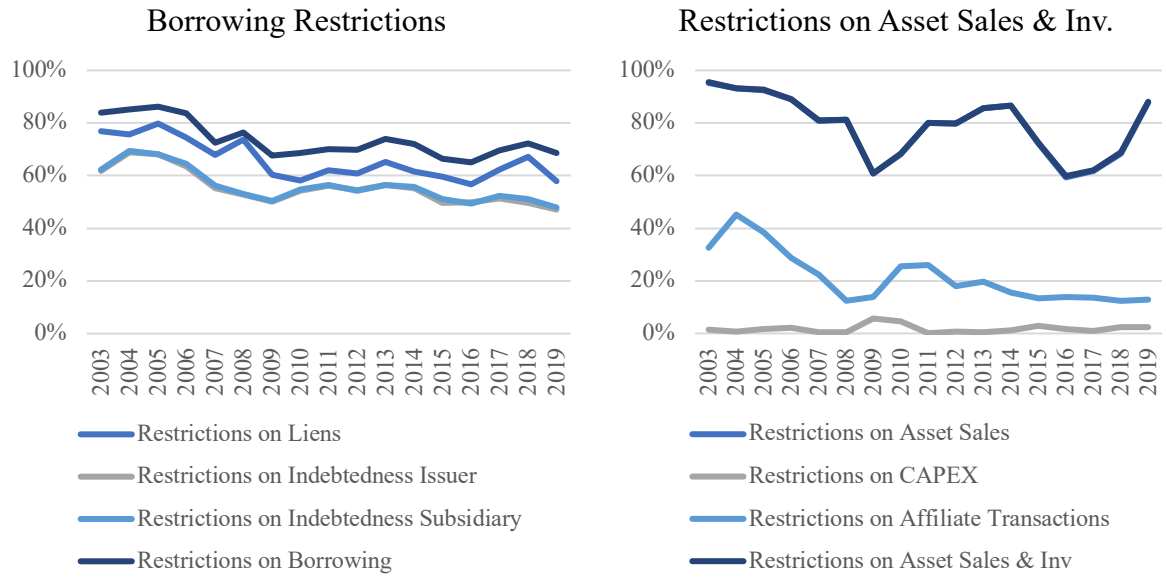


Figure 6: Covenant Protection Index in Sample (High Yield and Investment-Grade).

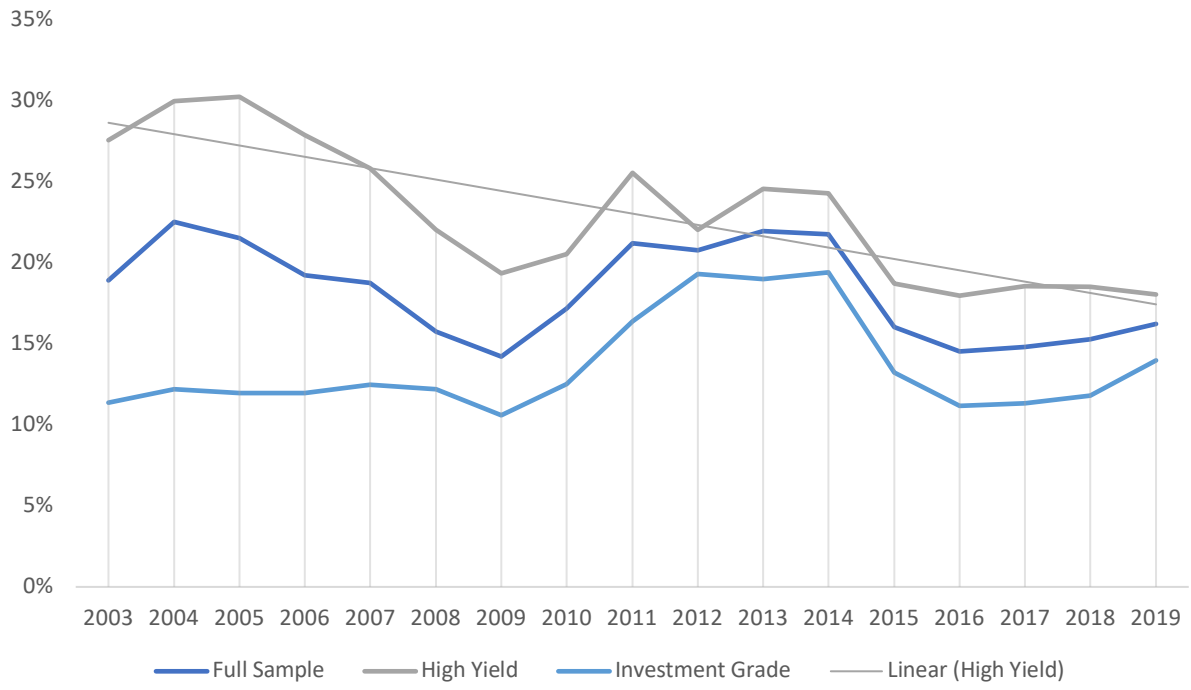
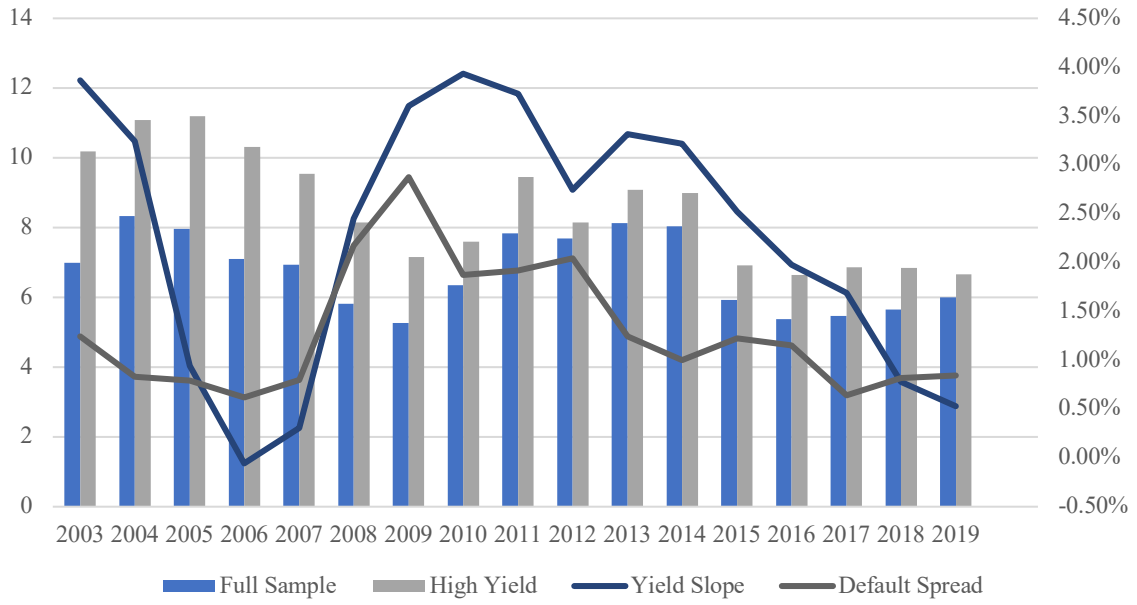
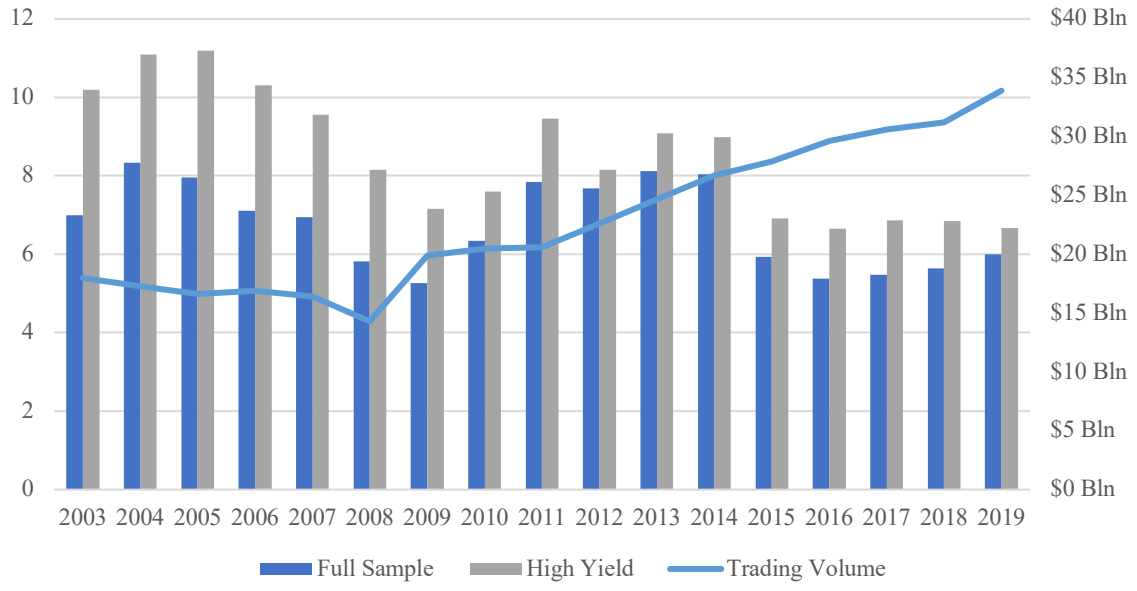


Figure 7: Annual Average of Bond Covenants with Yield Slope and Default Spread.



Source: Securities Industry and Financial Markets Association (SIMFA).

Figure 8: Annual Average of Bond Covenants with Average Daily Trading Volume in the U.S. Corporate Bond Market.



Source: Securities Industry and Financial Markets Association (SIMFA).

Figure 9: Quarterly Average of Bond Covenants with Funds Ownership of U.S. Corporate Bonds.

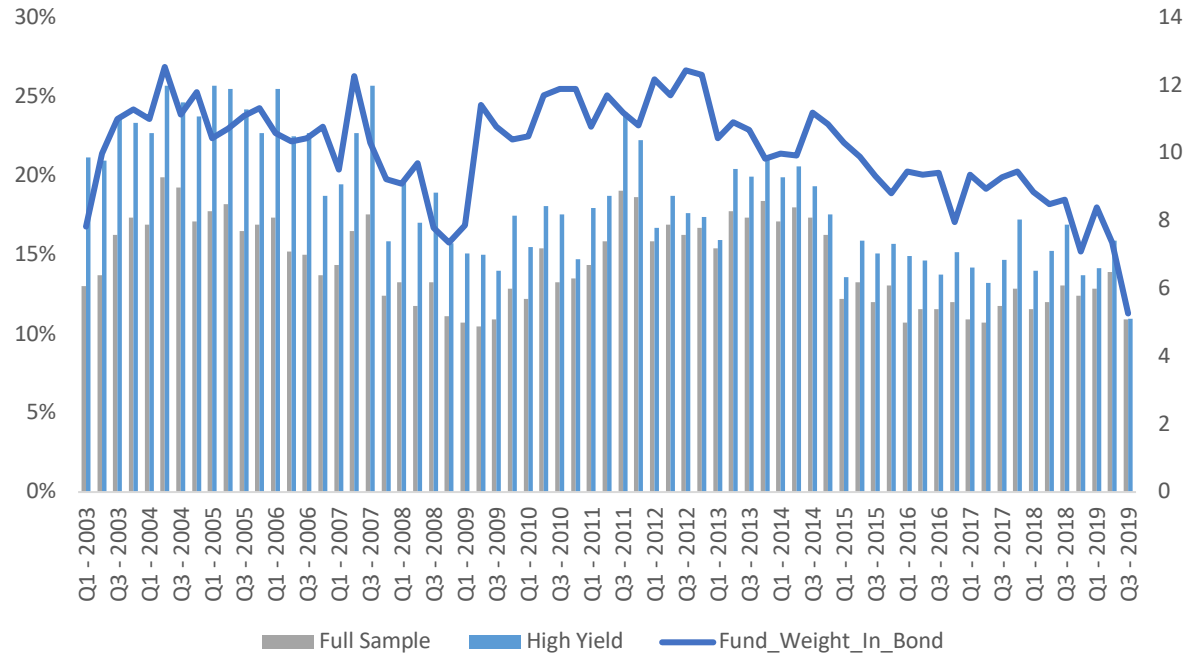


Figure 10: Bond Funds Asset Allocation in Corporate Bonds to Bonds with less than Mean Covenants.

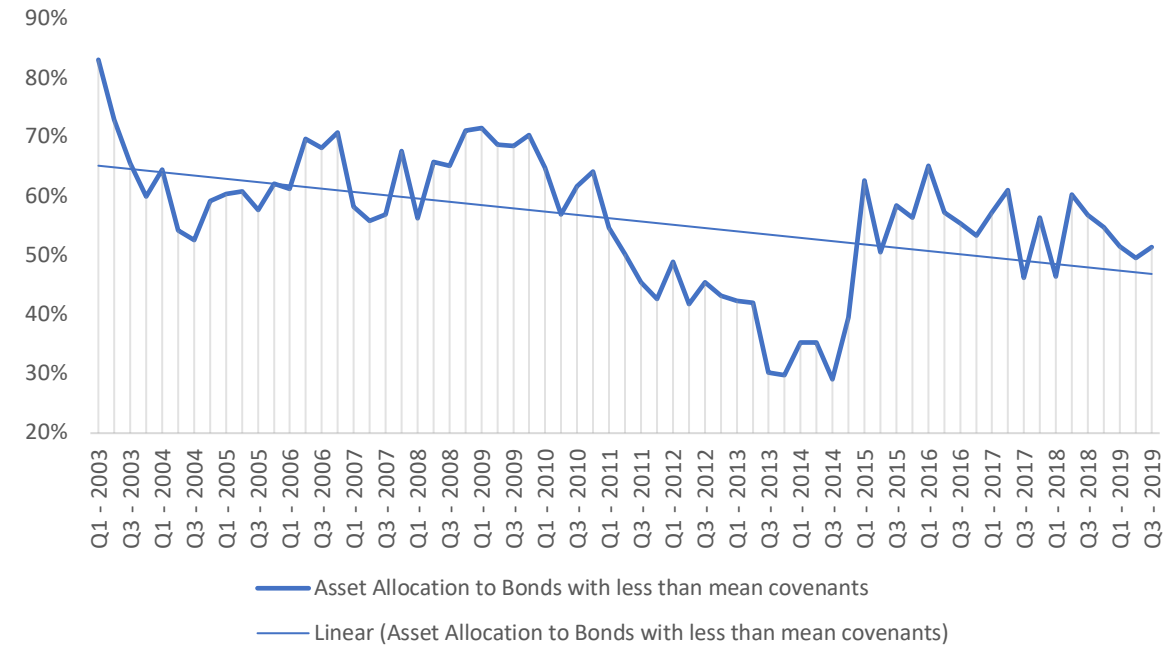


Table 4: Bond-Level Variables Description and Units of Measurement.

Variables Description	
Yield Slope	30-Year Treasury Rate minus 1-Year Treasury Rate (in Percent)
Default Spread	BBB minus AAA U.S. Corporate Index (in Percent)
Trading Volume	Average Daily Trading Volume (in Billions)
Fund_Weight_In_Bond	Percentage of a bond held by each fund from Morningstar (in Percent)
Fund-Level Controls:	
Offering AMT	Par Value of debt initially offered (in Thousands)
Maturity	Length of time until the maturity date (in Years)
Coupon	Current annual interest rate paid on the bond (in Percent)
Rating	Rating assigned to the bond (Scale from 1 (AAA) to 27 (NR))
Country-Level Controls	
Inflation	Inflation as measured by the Consumer Price Index (Annual %)
GDP Growth	Annual GDP growth rate at market prices (Annual %)
Industry Group	Industry Group to which the issuer belongs (Code 1 to 4)

Table 5: Fund-Level Variables Description and Units of Measurement.

Variables Description	
Allocation to Bonds with Less than Mean Covenants	Allocation to bonds with less than 6.75 covenants (in % of Holdings in Corporate Bonds)
Yield Slope	30 Year Treasury minus 1 Year Treasury (in Percent)
Default Spread	BBB minus Aaa U.S. Corporate Index (in Percent)
Trading Volume	Average Daily Trading Volume (in Billions)
Fund-Level Controls:	
HY Fund Dummy	= 1 if High Yield Fund, 0 otherwise
Size	Monthly Total Assets under Management (in Dollars)
Expense Ratio	Monthly Rate of Assets deducted each fiscal year for fund expenses (in Percent)
Net Flows	Monthly Estimate of the money put in or withdrawn by fund investors (in % of Size)
Returns	Monthly Returns (in Percent)

Table 6: Number of Covenants: Cross-Sectional Evidence.

This table reports the Poisson coefficients for the relation between *number of covenants* and Interest Rate Environment, Market Liquidity, and Funds Participation in the U.S. Corporate Bond Market. The regressors are described in **Table 4**. Robust standard errors are displayed in parenthesis. ***, ** and * represent significance levels of 1%, 5% and 10%, respectively.

Dependent Variable:	*Number of Covenants*				
	Full Sample			High Yield	Investment-Grade
	(1)	(2)	(3)	(4)	(5)
Yield Slope	0.05***	0.04***	0.04***	0.02***	0.06***
	(0.006)	(0.005)	(0.005)	(0.007)	(0.005)
Default Spread	-0.11***	-0.1***	-0.07***	-0.12***	0.04***
	(0.001)	(0.010)	(0.012)	(0.020)	(0.010)
Log Trading Volume	-0.29***	-0.03	0.04	-0.2	0.11***
	(0.036)	(0.033)	(0.037)	(0.047)	(0.032)
Bond Fund Weight	0.005***	0.004***	0.004***	0.003***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	0.001)
Issue-Level Controls:					
Log Offering AMT	-	-0.27*	-0.45***	0.02	-1.21***
		(0.105)	(0.157)	(0.180)	(0.118)
Maturity	-	-0.01***	-0.02***	-0.01***	0.00***
		(0.001)	(0.001)	(0.001)	(0.001)
Coupon	-	0.07***	-0.06***	0.07***	-0.04***
		(0.004)	(0.004)	(0.004)	(0.005)
Rating	-	0.01***	0.01***	0.00	0.06***
		(0.001)	(0.001)	(0.002)	(0.003)
Country-Level Controls:					
GDP Growth	-	-	0.02***	0.01***	0.02***
			(0.041)	(0.006)	(0.003)
Inflation	-	-	0.01*	-0.00	0.04***
			(0.007)	(0.007)	(0.007)
Industry Group	No	No	Yes	Yes	Yes
Constant	2.73***	2.14***	2.47***	2.41***	3.98***
	(0.121)	(0.403)	(0.403)	(0.462)	(0.462)
Observations	16 723	16 723	16 723	8 305	8 418
Pseudo R2	0.03	0.1	0.11	0.08	0.06
LLR test	-53 774	-50 045	-49 461	-29 103	-19 154
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 7: Allocation to bonds with less than mean covenants: Time-Series Evidence.

This table reports the OLS coefficients of *allocation to bonds with less than mean covenants* on the Interest Rate Environment and Market Liquidity. The regressors are described in **Table 5**. Robust standard errors are displayed in parenthesis. ***, ** and * represent significance levels of 1%, 5% and 10%, respectively.

Dependent Variable:	*Allocation to bonds with less than mean covenants*	
	(1)	(2)
Yield Slope	-3.20***	-3.45***
	(0.192)	(0.180)
Default Spread	7.76***	6.26***
	(0.271)	(0.263)
Log Trading Volume	16.25***	4.21***
	(0.279)	(1.067)
Fund-Level Controls:		
High Yield Fund Dummy	-	-34.95***
		(0.705)
Log Size	-	-2.44***
		(0.186)
Expense Ratio	-	0.1***
		(0.026)
Observations	33 589	33 589
R2	0.708	0.769
F-test	2 281	3 267
	(0.000)	(0.000)

Table 8: Fund Returns and Fund Flows on Allocation to bonds with less than mean covenants.

This table reports the OLS estimates for the relation between fund returns or fund flows and *allocation to bonds with less than mean covenants*. The original merged Morningstar sample of 33 589 observations gets reduced to 29 969 observations due to the inclusion of lagged variables. The regressors are described in **Table 5**. Robust standard errors are displayed in parenthesis. ***, ** and * represent significance levels of 1%, 5% and 10%, respectively.

Dependent Variable:	*Fund Returns*		*Fund Flows*	
	(1)	(2)	(1)	(2)
Allocation to bonds with less than mean covenants (past quarter)	0.003*** (0.000)	0.002*** (0.000)	0.0023** (0.001)	0.0012 (0.001)
Fund-Level Controls:				
High Yield Fund Dummy	-	0.22*** (0.018)	-	0.13 (0.097)
Log Size (past quarter)	-	0.00*** (0.001)	-	-0.02*** (0.005)
Expense Ratio (past quarter)	-	0.07*** (0.010)	-	-0.10 (0.113)
Net Flows (past year average)	-	0.05*** (0.079)	-	1.01*** (0.098)
Returns (past quarter)	-	-	-	0.10 (0.083)
Returns Sqr. (past quarter)	-	-	-	0.03*** (0.006)
Observations	29 969	29 969	29 969	29 969
R2	0.03	0.04	0	0.284
F-test	1 165 (0.000)	3 267 (0.000)	4.85 (0.03)	76.13 (0.000)

Table 9: Covenant Dummy: Cross-Sectional Evidence.

The following table reports the coefficients from the Logistic regression of *Covenant Dummy* on Interest Rate Environment, Market Liquidity, and Funds Participation in the U.S. Corporate Bond Market. The covenant dummy takes the value of 1 in case the number of covenants in place for a bond is above the mean. The regressors are described in **Table 4**. Robust standard errors are displayed in parenthesis. ***, ** and * represent significance levels of 1%, 5% and 10%, respectively.

Dependent Variable:	*Covenant Dummy*		
	(1) Full-Sample	(2) High Yield	(3) Investment Grade
Yield Slope	0.21***	0.14***	0.31***
	(0.024)	(0.032)	(0.043)
Default Spread	-0.07	-0.31***	0.28***
	(0.059)	(0.077)	(0.087)
Log Trading Volume	1.02***	-0.17	1.55***
	(0.171)	(0.192)	(0.284)
Bond Fund Weight	0.03***	0.03***	0.02***
	(0.003)	(0.003)	(0.004)
Issue-Level Controls:			
Log Offering AMT	-3.05***	-1.05	-4.41***
	(0.621)	(0.735)	(1.094)
Maturity	-0.01***	-0.02***	0.02***
	(0.003)	(0.005)	(0.004)
Coupon	0.13***	0.17***	-0.20***
	(0.015)	(0.016)	(0.035)
Rating	0.03***	0.01*	0.27***
	(0.004)	(0.007)	(0.039)
Country-Level Controls:			
GDP Growth	0.08***	0.11***	0.03
	(0.029)	(0.025)	(0.041)
Inflation	0.11**	0.03	0.21***
	(0.043)	(0.029)	(0.054)
Industry Group	Yes	Yes	Yes
Constant	2.7***	1.90	3.69
	(0.024)	(1.928)	(3.049)
Observations	16 723	8 305	8 418
Pseudo R2	0.16	0.12	0.16
LLR test	-9 666	-4 968	-4 228
	(0.000)	(0.000)	(0.000)

Table 10: Covenant Protection Index: Cross-Sectional Evidence.

This table reports estimates from the OLS regression of *Covenant Protection Index* on Interest Rate Environment, Market Liquidity, and Funds Participation in the U.S. Corporate Bond Market. The Covenant Protection Index is obtained by dividing the number of covenants in a bond by the 37 conceivable covenants. The regressors are described in **Table 4**. Robust standard errors are displayed in parenthesis. ***, ** and * represent significance levels of 1%, 5% and 10%, respectively.

Dependent Variable:	*Covenant Protection Index*	
	(1) Full Sample	(2) High Yield
Yield Slope	0.67***	0.31*
	(0.100)	(0.170)
Default Spread	-1.09***	-2.66***
	(0.225)	(0.408)
Log Trading Volume	0.86	-4.78***
	(0.682)	(1.081)
Bond Fund Weight	0.13***	0.12***
	(0.022)	(0.028)
Issue-Level Controls:		
Log Offering AMT	-12.51***	-0.74
	(2.842)	(4.024)
Maturity	-0.1***	-0.19***
	(0.012)	(0.020)
Coupon	1.26***	1.59***
	(0.079)	(0.088)
Rating	0.21***	0.10**
	(0.019)	(0.045)
Country-Level Controls:		
GDP Growth	0.42***	0.33**
	(0.087)	(0.142)
Inflation	0.26*	-0.03
	(0.150)	(0.154)
Industry Group	Yes	Yes
Constant	37.63***	29.97
	(7.472)	(1.928)
Observations	16 723	8 305
R2	0.262	0.19
F test	189.8	-4 968
	(0.000)	(0.000)